COMMUNICATIONS
TO THE EDITOR

Communications for this section will be published as space and priorities permit. The comments should not exceed 350 words in length, with a maximum of five references; one figure or table can be printed. Exceptions may occur under particular circumstances. Contributions may include comments on articles published in this periodical, or they may be reports of unique educational character. Specific permission to publish should be cited in a covering letter or appended as a postscript.

In Defense of Low Glucose Level in Pleural Fluid

To the Editor:

Regarding the article by Angelillo and O'Donohue1 entitled "Yellow Nail Syndrome with Reduced Glucose Level in Pleural Fluid," we disagree with several statements that were made about low concentrations of glucose in the pleural fluid.

Angelillo and O'Donohue stated that a glucose level of less than 10 mg/100 ml of pleural fluid is "unexpected except in rheumatoid arthritis, tuberculosis, and rarely in malignant disease."2(6)34 Rheumatoid effusions almost always have glucose levels in the pleural fluid that are less than 10 mg/100 ml, but tuberculous and malignant pleural effusions more commonly have normal levels of glucose.2,34 Even when the concentrations of glucose are low in malignant effusions, the levels generally range between 30 and 80 mg/100 ml.4,5 A low level of glucose in the pleural fluid is characteristic of empyemas, and very low levels occur with some frequency.4,5 When thoracentesis is performed early in the course of an empyema, the pH will be low (less than 7.30), and, rarely, the glucose level of the pleural fluid may be normal; however, over the next several hours the glucose level of the pleural fluid will decrease below 60 mg/100 ml, as the influx of glucose cannot keep pace with its utilization.

In the case presented by Angelillo and O'Donohue, the cause of the massive left-sided pleural effusion was an anaerobic empyema, presumably secondary to an anaerobic pneumonia (in a patient with mental retardation, a seizure disorder, and poor oral hygiene), superimposed on the pleural effusion of the yellow nail syndrome. The failure to observe parenchymal infiltrates on chest roentgenograms does not preclude the diagnosis of a parapneumonic effusion, as an alveolar infiltrate can be obscured by a massive pleural effusion.

The pleural effusion associated with the yellow nail syndrome presumably occurs as a result of impaired lymphatic drainage of normally formed pleural fluid. Thus, this mechanism would initially lead to a transudate. Because protein is removed by lymphatic drainage alone, an exudative pleural effusion would eventually result as protein accumulates. Influx of efflux of glucose from the pleural space should not be affected by this abnormality and, thus, should remain equal to the serum level of glucose. The predominant mechanism responsible for the low glucose level in the pleural fluid in empyemas is increased utilization of glucose by the constituents of the pleural fluid, namely, phagocytosing leukocytes and multiplying bacteria. A relative block to the influx of glucose into the pleural space and the metabolism of glucose by the pleural membrane also may play a role.

It has been shown that there may be a lag of from two to four hours until the appearance of glucose in the pleural fluid after glucose loading.6 Since thoracenteses were done 60 and 90 minutes after glucose loading, adequate time may not have elapsed for glucose to appear in the pleural fluid. The reason that the pleural fluid was sterile with the first three thoracenteses probably was failure to perform careful anaerobic cultures. Thus, initially the patient presumably had an untreated anaerobic empyema with a low concentration of glucose. The failure of the glucose level in the pleural fluid to rise after five days of antibiotic therapy does not imply that the patient's glucose level in the pleural fluid was chronically low. In serial studies of patients with empyemas, we have found that several days are required for the glucose concentration in the pleural fluid to rise above 60 mg/100 ml, despite appropriate antibiotic therapy and drainage.

We have demonstrated on numerous occasions a pleural effusion with a low pH and low glucose level occurring in the presence of nonpurulent fluid with a low leukocyte count and negative bacteriologic tests.2 These effusions usually represent partially treated or anaerobic empyemas.

We think that with the evidence presented, it is not unjustified to include the yellow nail syndrome as a disease associated with a low level of glucose in the pleural fluid. The documented causes of effusions with low glucose concentrations in the pleural fluid are (1) empyema, (2) rheumatoid pleurisy, (3) lupus pleuritis, (4) malignant disease, (5) tuberculosis, and (6) esophageal rupture.

Steven A. Sahn, M.D., F.C.C.P.
and James T. Good, Jr., M.D.
Division of Pulmonary Sciences
University of Colorado Medical Center, Denver

References


To the Editor:

In the January, 1979 issue of Chest (75:83-85), Angelillo and O'Donohue described a patient with yellow nail syndrome, and from that single incident they proposed the syndrome to be included in the list of diseases associated with a glucose level of less than 10 mg/100 ml in the pleural fluid. To the best of my knowledge, among the 13 previously reported cases1-9 there were two instances4,5 in which glucose values in the pleural aspirate were documented to be 89 and 90 mg/dl respectively. I feel that the term "yellow nail syndrome" should not be applied to cases of lymphedema and pleural effusion without cardinal features of yellow nails.

It is tenable that in the case described by Angelillo and
O'Donohue the pleural manifestation occurred by accident, not associated with the common etiologic relationship of the yellow nail syndrome, namely, the primarily defective lymphatic circulation. The history data on their patient as having profound mental retardation and being under continuous use of anticonvulsants and sedatives, suggests a propensity toward the development of aspiration episodes from which pneumonitis or lung abscess with empyema might concur.

A febrile course coupled with pleural fluid examinations showing an initial count of 240 cells/cu mm, predominantly polymorphonuclear leukocytes, which ultimately became frank pus, was consistent with an infective process. It is here remarked that previous cases of the yellow nail syndrome exhibited lymphocytic effusions.1,2,3 Subsequent isolation of anaerobic pathogenic organisms in the case reported by Angelillo and O'Donohue, Jr, provided further support to the preliminary diagnosis of pneumonia by aspiration with parapneumonic effusion. Additional information that "no parenchymal infiltrates were observed on chest roentgenograms," did not rule out concurrent lung inflammation, but rather reflected the interpretation of follow-up films after effective treatment.

The mechanisms for low glucose levels in the pleural exudate are an excessive utilization by inflammatory cells and the impairment of diffusion across the thickened inflammatory membrane lining the pleural cavity. Results of thoracocenteses performed 60 and 90 minutes after loading with glucose and showing no rise in glucose levels supported the idea of an undue delay in glucose transportation from the blood to the pleural fluid.

Somchai Booromkitti, M.D., F.C.C.P.
Professor of Medicine,
Department of Medicine,
Faculty of Medicine Siriraj Hospital,
Mahidol University, Bangkok, Thailand

Reprint requests: Dr. Booromkitti, Department of Medicine, Siriraj Hospital, Bangkok 7, Thailand

REFERENCES

To the Editor:

The concluding sentence of the case report by Angelillo and O'Donohue states that the yellow nail syndrome "may also be included in the list of diseases that are associated with a glucose level in the pleural fluid of less than 10 mg% 100 ml." This statement is on shaky ground since there is an additional diagnosis—empyema—which could explain the low glucose levels. The low glucose levels were all found in pleural fluid aspirate, seven days or less from the date when the empyema was diagnosed.

The authors state that the pleural effusion in their case was not a parapneumonic effusion because there were no parenchymal infiltrates on chest roentgenograms. However, the reliability of chest roentgenograms in ruling out parenchymal infiltrates in the presence of a pleural effusion (massive initially, and requiring decortication within two weeks) can be questioned. In this case, the history of a low-grade fever and findings of leucocytosis and left shift on admission suggests an infection. The background of seizure disorder, anticonvulsive medications, broken or missing teeth and most importantly, recovery of multiple anaerobic organisms from the pleural fluid suggests an aspirational (gravitational) route of infection, from the mouth to the lung. The characteristics of the pleural fluid-exudate, low glucose level, negative gram stain and neutrophilic predominance (increasing in number from 240/cu mm to 4000/cu mm) are all very consistent with a parapneumonic effusion evolving into an empyema. Determination of pH of the pleural fluid is helpful in differentiating complicated (empyemic or loculated) from benign parapneumonic effusions.1 Measurement of pH of pleural fluid from the initial thoracocentesis and serially in this case may have resulted in a decision to institute chest tube earlier.

Pleural effusions in yellow nail syndrome are often bilateral or unilateral, at times massive, and tend to be chronic.2 In the few cases where information is available regarding the pleural fluid cell count, the predominant cells have been lymphocytes.3,4 Hiller et al reported normal concentration of glucose in the pleural fluid. To add low glucose level as another possible characteristic of the pleural effusion in yellow nail syndrome, on the basis of present information is not tenable and may be misleading.

C. P. Kesavan Kutty, M.D. and
Basil Varkey, M.D., F.C.C.P.
Veterans Administration Medical Center,
Milwaukee, Wisconsin

REFERENCES

To the Editor:

We do not disagree with the general comments relative to a low glucose level in pleural fluid, as presented in the first paragraph of the communication by Sahn and Good, although the purpose of our case report was not to review all aspects of glucose in pleural effusion. We disagree with the opinion of Sahn and Good that the initial cause of the pleural effusion in our case was due to empyema. The fluid obtained by thoracocentesis at the time of admission did not demonstrate a reduced pH, purulence, or bacterial growth from properly obtained anaerobic cultures. Under no known medical criteria could this be considered an empyema or parapneumonic effusion. Surely one would have difficulty explaining the reduced level of glucose found on the initial thoracocentesis on the basis of "phagocytosing leukocytes and multiplying bacteria."

Sahn and Good point out that the thoracocenteses performed 60 and 90 minutes after glucose loading may have allowed insufficient time for the glucose to appear in the